

EXHIBIT 7

SECOND AMENDED EXHIBIT B: P.R. 3-1(C) CHART FOR U.S. PATENT NO. 7,446,338

Plaintiff Solas OLED Ltd. (Solas) provides this chart based upon information that is presently available to it. Solas reserves the right to change or provide more detail to the infringement theories set forth below, based upon information that it learns during this case, subject to the Court's rules and orders.

Definitions:

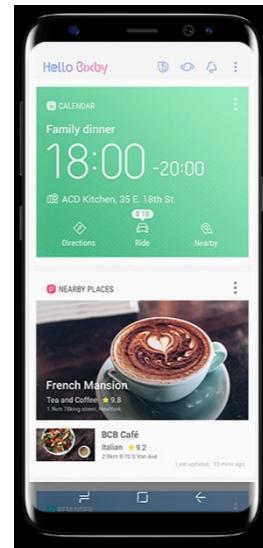
The term '338 Accused Instrumentalities is defined in Section I.B.2 of Plaintiff Solas OLED Limited's First Amended Disclosure of Asserted Claims and Infringement Contentions served on May 17, 2020.

Claim Element

'338 Accused Instrumentalities

1. A display panel comprising:

To the extent the preamble is deemed limiting, the '338 Accused Instrumentalities comprise a display panel. For example, the Samsung Galaxy S8 contains an OLED display panel:

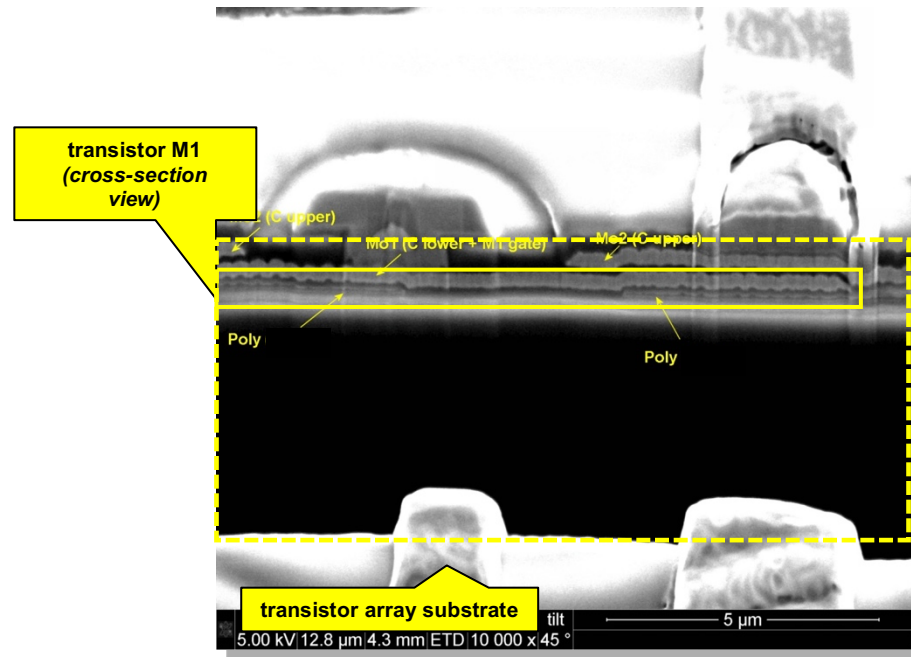


Claim Element

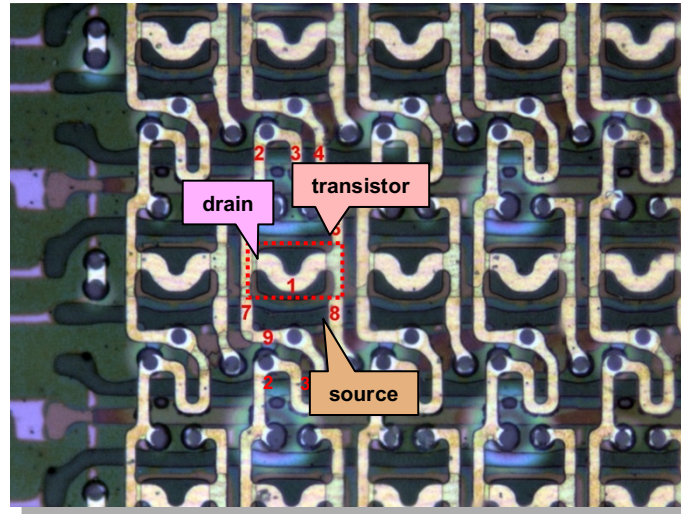
'338 Accused Instrumentalities

[1a] a transistor array substrate which includes a plurality of pixels and comprises a plurality of transistors for each pixel, each of the transistors including a gate, a gate insulating film, a source, and a drain;

The '338 Accused Instrumentalities comprise a transistor array substrate which includes a plurality of pixels and comprises a plurality of transistors for each pixel, each of the transistors including a gate, a gate insulating film, a source, and a drain. For example, the Samsung Galaxy S8 contains a transistor array substrate:



The transistor array substrate includes a plurality of pixels and comprises a plurality of transistors for each pixel, each of the transistors including a gate, a gate insulating film, a source, and a drain:

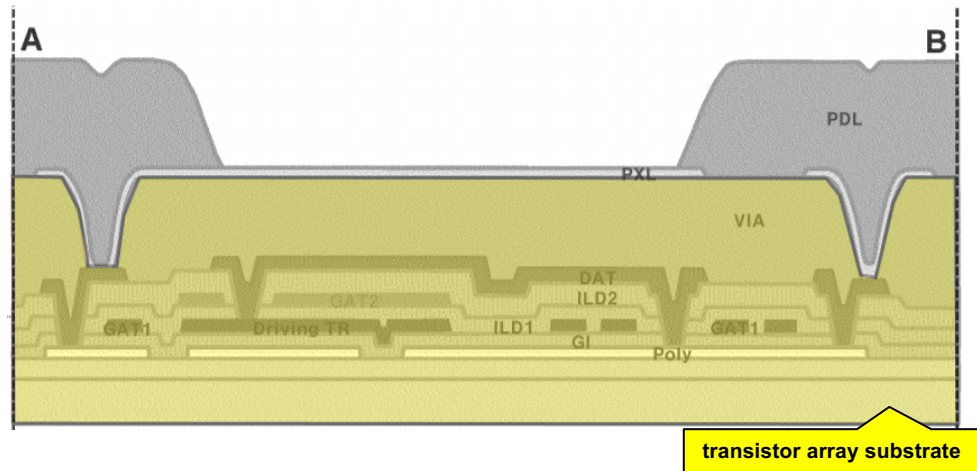


Defendants' document production and GDS files further show the '338 Accused Instrumentalities comprise a transistor array substrate which includes a plurality of pixels and comprises a plurality of transistors for each pixel, each of the transistors including a gate, a gate insulating film, a source, and a drain.

See, for example, SDC0254867, at SDC0254878:

Claim Element

'338 Accused Instrumentalities



See also, for example, SDC0187911, at SDC0187914:

Claim Element

'338 Accused Instrumentalities

2. Process (SDR2)

SAMSUNG SECRET

	Layer	Material	Thickness (Å)	R _s (Ω/□)	Dielectric Constant	비고
A3	HPDL (SPC)	PI	15,000 (+16,000)		3.2	
	PXL	ITO/Ag/ITO	70/850/50	0.35		
	VIA	PI	16,000		3.2	
	DAT	Ti/Al/Ti	300/6,000/700	0.043		
	VIA0	PI	16,000		3.2	
	ILD2	SiNx/SiO ₂	2,000/3,000		6.6/4.6	
	GAT2	Mo	2,500	0.49		
	ILD1	SiNx	1,300		7.0	
	GAT1	Mo	2,500	0.5		
	GI	SiO ₂	1200		4.84	KR3 습간잔상 개선 조건
	ACT	p-Si	500	2,996(PPOLY)		
	Buffer	SiO ₂ /SiNx	3,000/500			
	Barrier	SiO ₂	5,000			
	2 nd PI	PI	58,000			
	Barrier	a-Si/SiO ₂	15/6,000			
1 st PI	PI	58,000			Y-OCTA crack 이슈	

transistor array substrate

삼성디스플레이 삼성디스플레이

'16.05.12/ BP 개발그룹 / 신예진 책임, 문종수 책임, 김광민 책임, 김동수 선임

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Display beyond Imagination

Claim Element

'338 Accused Instrumentalities

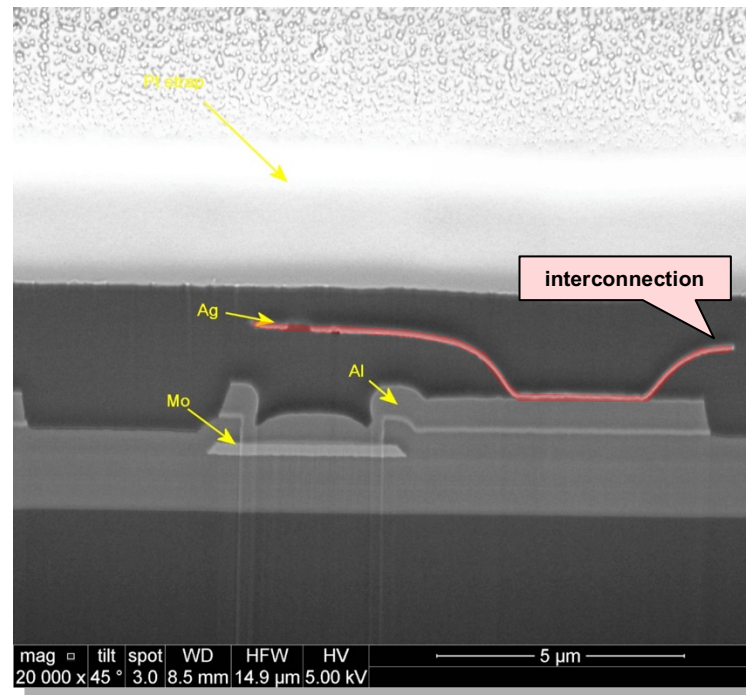
See also, for example, SDC0186067, at SDC0186070; SDC0179894 at SDC0179897; SDC0183865 at SDC0183868; SDC0177193 at SDC0177198; SDC0181317 at SDC0181320; SDC0180696 at SDC0180700; SDC0183107 at SDC0183109; SDC0180034 at SDC0180038; SDC0175340 at SDC0175342; SDC0190264 at SDC0190269; SDC0187113 at SDC0187130. Defendants' GDS files produced in this litigation further show the transistor array substrates of the '338 Accused Instrumentalities include a plurality of pixels and comprises a plurality of transistors for each pixel, each of the transistors including a gate, a gate insulating film, a source, and a drain. See, for example, SDC_SC_0000128; SDC_SC_0000144; SDC_SC_0000148; SDC_SC_0000152; SDC_SC_0000168; SDC_SC_0000172; SDC_SC_0000196; SDC_SC_0000200; SDC_SC_0000204; SDC_SC_0000212; SDC_SC_0000220; SDC_SC_0000224; SDC_SC_0000232.

Claim Element

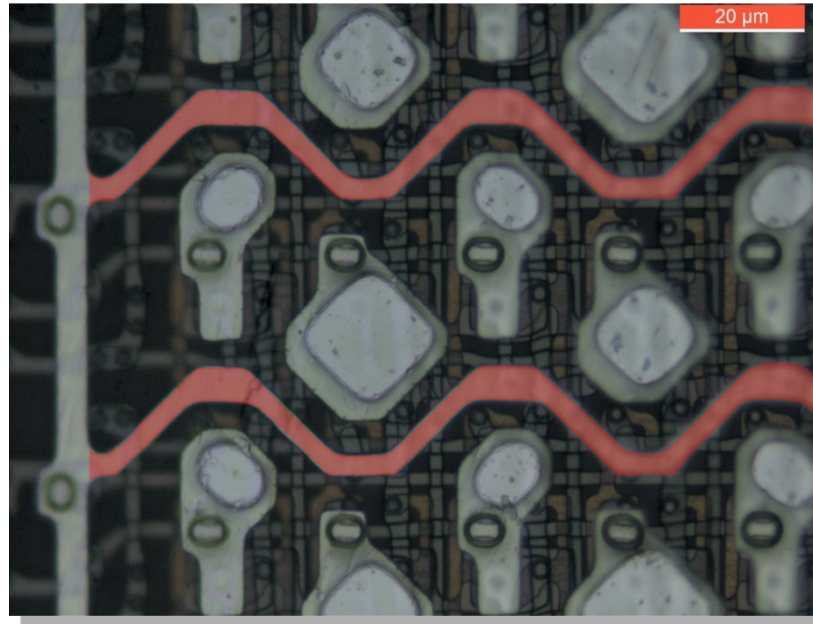
'338 Accused Instrumentalities

[1b] a plurality of interconnections which are formed to project from a surface of the transistor array substrate, and which are arrayed in parallel to each other;

The '338 Accused Instrumentalities comprise a plurality of interconnections which are formed to project from a surface of the transistor array substrate, and which are arrayed in parallel to each other. For example, the Samsung Galaxy S8 contains a plurality of interconnections which are formed to project from a surface of the transistor array substrate:



These interconnections are arrayed in parallel to each other:



Defendants' GDS files produced in this litigation further show a plurality of interconnections which are formed to project from a surface of the transistor array substrate, and which are arrayed in parallel to each other. See, for example, SDC_SC_0000130; SDC_SC_0000146; SDC_SC_0000150; SDC_SC_0000154; SDC_SC_0000170; SDC_SC_0000174; SDC_SC_0000198; SDC_SC_0000202; SDC_SC_0000206; SDC_SC_0000214; SDC_SC_0000222; SDC_SC_0000226; SDC_SC_0000234.

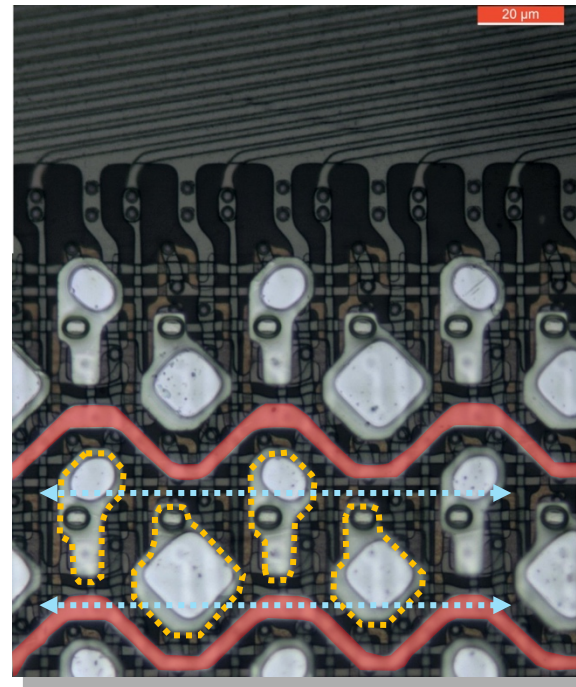
To the extent that Samsung contends that the limitation "arrayed in parallel to each other" is not literally present, this limitation is present under the doctrine of equivalents.

Claim Element

'338 Accused Instrumentalities

[1c] a plurality of pixel electrodes for the plurality of pixels, respectively, the pixel electrodes being arrayed along the interconnections between the interconnections on the surface of the transistor array substrate;

The '338 Accused Instrumentalities comprise a plurality of pixel electrodes for the plurality of pixels, respectively, the pixel electrodes being arrayed along the interconnections between the interconnections on the surface of the transistor array substrate. For example, the Samsung Galaxy S8 contains a plurality of pixel electrodes (in dashed yellow outlines below) for the plurality of pixels, respectively, the pixel electrodes being arrayed along the interconnections between the interconnections on the surface of the transistor array substrate:



Defendants' GDS files produced in this litigation further show a plurality of pixel electrodes for the plurality of pixels, respectively, the pixel electrodes being arrayed along the

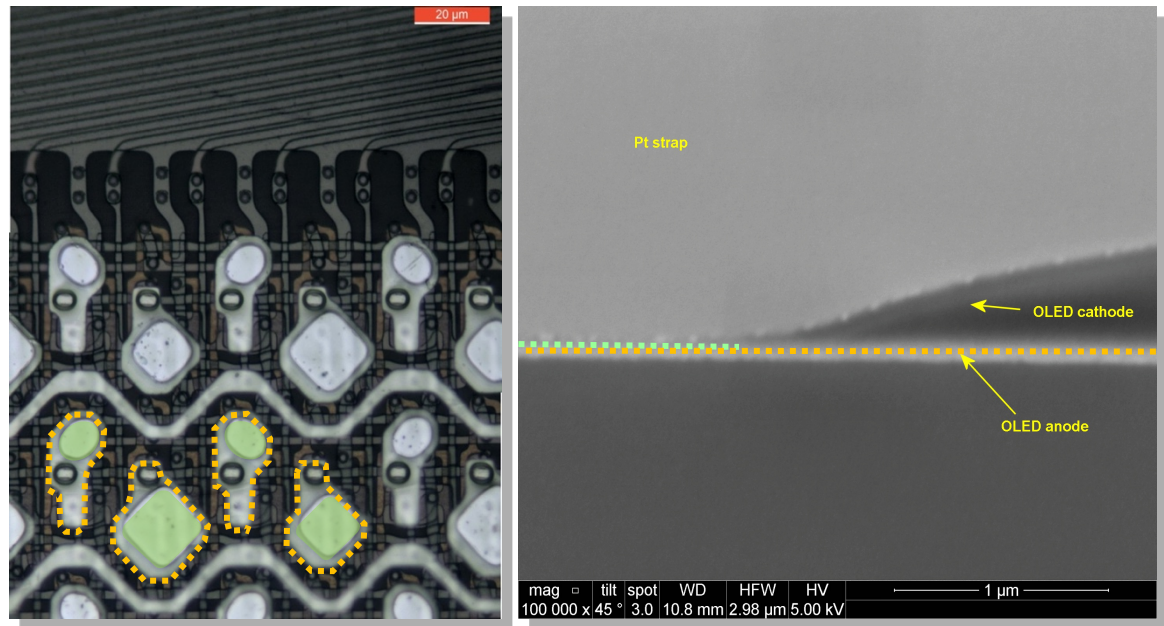
Claim Element

'338 Accused Instrumentalities

interconnections between the interconnections on the surface of the transistor array substrate. See, for example, SDC_SC_0000130; SDC_SC_0000146; SDC_SC_0000150; SDC_SC_0000154; SDC_SC_0000170; SDC_SC_0000174; SDC_SC_0000198; SDC_SC_0000202; SDC_SC_0000206; SDC_SC_0000214; SDC_SC_0000222; SDC_SC_0000226; SDC_SC_0000234.

[1d] a plurality of light-emitting layers formed on the pixel electrodes, respectively; and

The '338 Accused Instrumentalities comprise a plurality of light-emitting layers formed on the pixel electrodes, respectively. For example, the Samsung Galaxy S8 contains a plurality of light-emitting layers (highlighted in green below) formed on the pixel electrodes ("OLED anode" below), respectively:



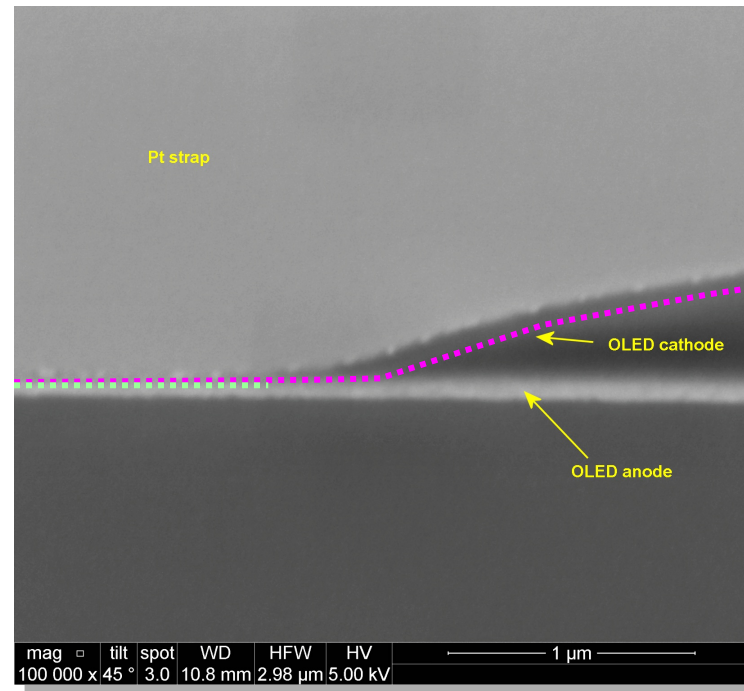
Claim Element

'338 Accused Instrumentalities

Defendants' GDS files produced in this litigation further show a plurality of light-emitting layers formed on the pixel electrodes, respectively. See, for example, SDC_SC_0000130; SDC_SC_0000146; SDC_SC_0000150; SDC_SC_0000154; SDC_SC_0000170; SDC_SC_0000174; SDC_SC_0000198; SDC_SC_0000202; SDC_SC_0000206; SDC_SC_0000214; SDC_SC_0000222; SDC_SC_0000226; SDC_SC_0000234.

[1e] a counter electrode which is stacked on the light-emitting layers,

The '338 Accused Instrumentalities comprise a counter electrode which is stacked on the light-emitting layers. For example, the Samsung Galaxy S8 contains a counter electrode ("OLED cathode" below) which is stacked on the light-emitting layers:

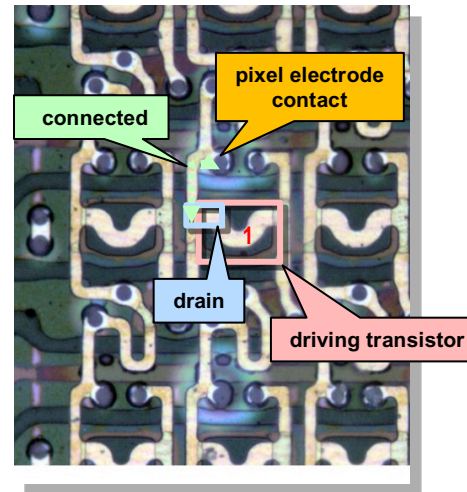


Claim Element

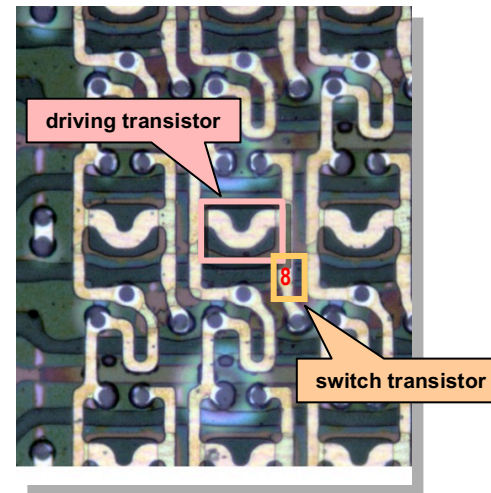
'338 Accused Instrumentalities

[1f] wherein said plurality of transistors for each pixel include a driving transistor, one of the source and the drain of which is connected to the pixel electrode, a switch transistor which makes a write current flow between the drain and the source of the driving transistor, and a holding transistor which holds a voltage between the gate and source of the driving transistor in a light emission period.

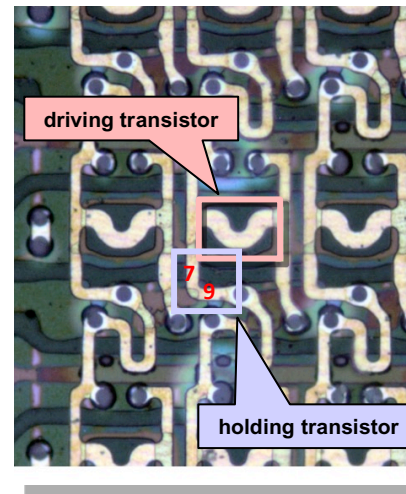
In the '338 Accused Instrumentalities, the plurality of transistors for each pixel include a driving transistor, one of the source and the drain of which is connected to the pixel electrode, a switch transistor which makes a write current flow between the drain and the source of the driving transistor, and a holding transistor which holds a voltage between the gate and source of the driving transistor in a light emission period. For example, in the Samsung Galaxy S8, the plurality of transistors for each pixel includes a driving transistor, the drain of which is connected to the pixel electrode:



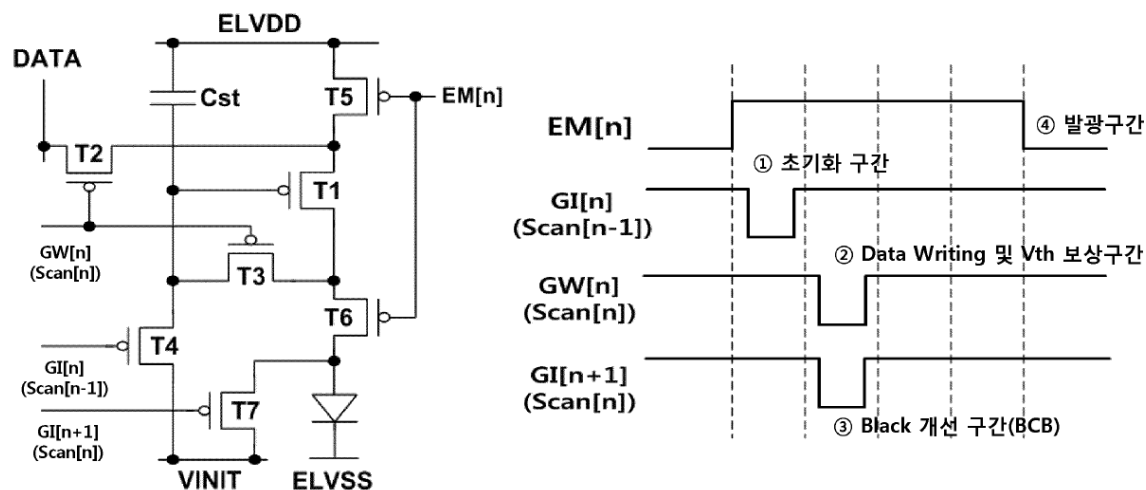
The plurality of transistors includes a switch transistor which makes a write current flow between the drain and the source of the driving transistor:



The plurality of transistors includes a holding transistor which holds a voltage between the gate and source of the driving transistor in a light emission period:



The pixel circuit is depicted in the following figure:



SDC0254867 at SDC0254882; see also SEC0000579 at SEC0000589.

During the “Data Writing” period, a current flows between the drain and source of the driving transistor T1. Rather than flowing through the electroluminescent element (depicted with the diode symbol in this schematic), as during the light emission period, the current during the data writing period is directed along a different path, away from the electroluminescent element. Current flows along the path depicted in a lighter color in the schematic at SEC0000589. Using the data line as a starting point, this path passes through transistor T2 (the accused “switch transistor”), T1 (the accused “driving transistor”), T3 (the accused “holding transistor”), the capacitor Cst, and the line ELVDD. During this flow of the write current, the line ELVDD acts as a current sink, using the convention that the direction of current is the direction of motion of positive charge carriers and the opposite of the direction of motion of negative charge carriers. The line labeled “Data line” also acts as a current sink, using the convention that the direction of current is the direction in which electrons flow.

See also, for example, SDC0186067, at SDC0186074; SDC0179894 at SDC0179901; SDC0183865 at SDC0183874; SDC0187911 at SDC0187928; SDC0177193 at SDC0177211; SDC0181317 at SDC0181333; SDC0180696 at SDC0180713; SDC0179297

Claim Element

'338 Accused Instrumentalities

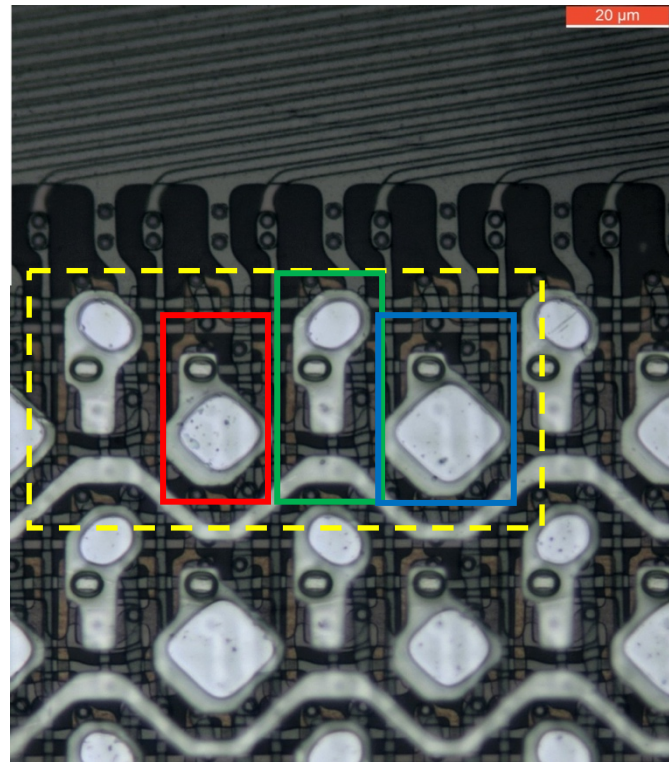
at SDC0179299; SDC0183107 at SDC0183113; SDC0180034 at SDC0180042; SDC0175340 at SDC0175346; SDC0190264 at SDC0190284; SDC0187113 at SDC0187132. Defendants' GDS files produced in this litigation further show said plurality of transistors for each pixel include a driving transistor, one of the source and the drain of which is connected to the pixel electrode, a switch transistor which makes a write current flow between the drain and the source of the driving transistor, and a holding transistor which holds a voltage between the gate and source of the driving transistor in a light emission period. See, for example, SDC_SC_0000128; SDC_SC_0000144; SDC_SC_0000148; SDC_SC_0000152; SDC_SC_0000168; SDC_SC_0000172; SDC_SC_0000196; SDC_SC_0000200; SDC_SC_0000204; SDC_SC_0000212; SDC_SC_0000220; SDC_SC_0000224; SDC_SC_0000232.

Claim Element

'338 Accused Instrumentalities

5. A panel according to claim 1, wherein said plurality of pixels include a red pixel, a green pixel, and a blue pixel.

The '338 Accused Instrumentalities comprise a plurality of pixels that includes a red pixel, a green pixel, and a blue pixel. For example, the Samsung Galaxy S8 contains red, green, and blue pixels, labelled by boxes with corresponding colors in the image below:

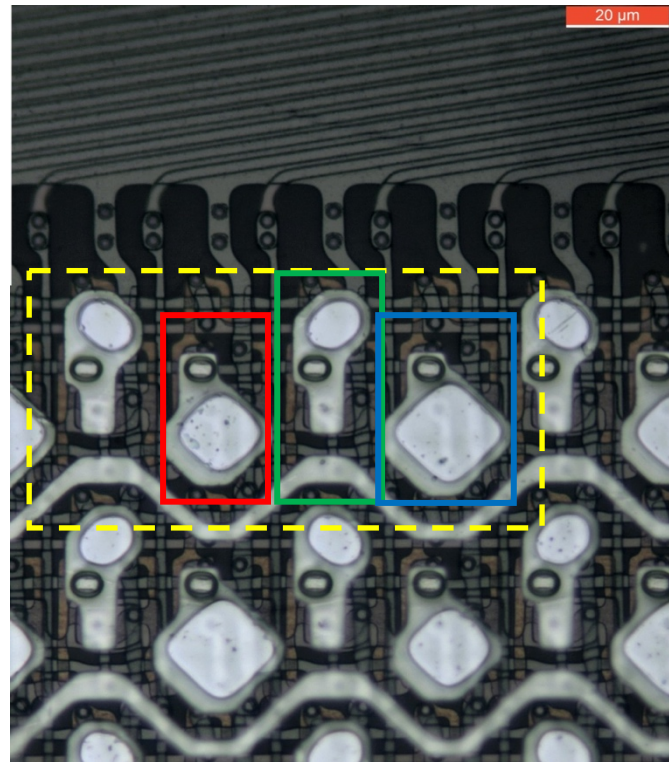


Claim Element

'338 Accused Instrumentalities

6. A panel according to claim 5, wherein said plurality of pixels comprises a plurality of sets each including the red pixel, the green pixel, and the blue pixel arrayed in an arbitrary order.

In the '338 Accused Instrumentalities, plurality of pixels comprises a plurality of sets each including the red pixel, the green pixel, and the blue pixel arrayed in an arbitrary order. For example, the Samsung Galaxy S8 contains red, green, and blue pixels, labelled by boxes with corresponding colors in the image below:



The pixels within the yellow dashed line are an example of one of the plurality of sets of pixels, and the order of pixels in each set is arbitrary.

Claim Element

'338 Accused Instrumentalities

9. A panel according to claim 1, wherein at least one of the interconnections has a resistivity of 2.1 to 9.6 $\mu\Omega\text{cm}$.

On information and belief, at least one of the interconnections in each of the '338 Accused Instrumentalities has a resistivity of 2.1 to 9.6 $\mu\Omega\text{cm}$.

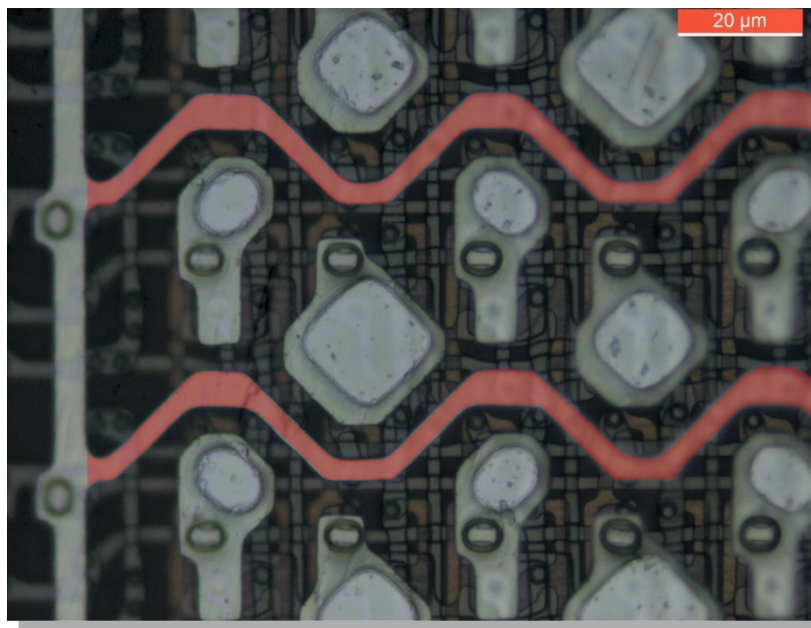
For example, in the interconnections in the Samsung Galaxy S8 Accused Instrumentality are made of layers of ITO (70 angstroms), silver (850 angstroms), and ITO (50 angstroms), one example, 970 angstroms, sheet resistance is 0.35 ohms per square, which denotes a resistivity that falls within the 2.1 to 9.6 $\mu\Omega\text{cm}$. *See, e.g.*, SDC0187911 at SDC0187914. See also, for example, SDC0186067, at SDC0186070; SDC0179894 at SDC0179897; SDC0183865 at SDC0183868; SDC0177193 at SDC0177198; SDC0181317 at SDC0181320; SDC0180696 at SDC0180700; SDC0183107 at SDC0183109; SDC0180034 at SDC0180038; SDC0175340 at SDC0175342; SDC0190264 at SDC0190269; SDC0187113 at SDC0187130.

10. A panel according to claim 1, wherein said plurality of interconnections are formed from a conductive layer that is different from a layer forming the source and the drain of each of the transistors and a layer forming the gate of the transistors.

In the '338 Accused Instrumentalities, said plurality of interconnections are formed from a conductive layer that is different from a layer forming the source and the drain of each of the transistors and a layer forming the gate of the transistors. For example, the Samsung Galaxy S8 contains interconnections formed from a conductive layer:

Claim Element

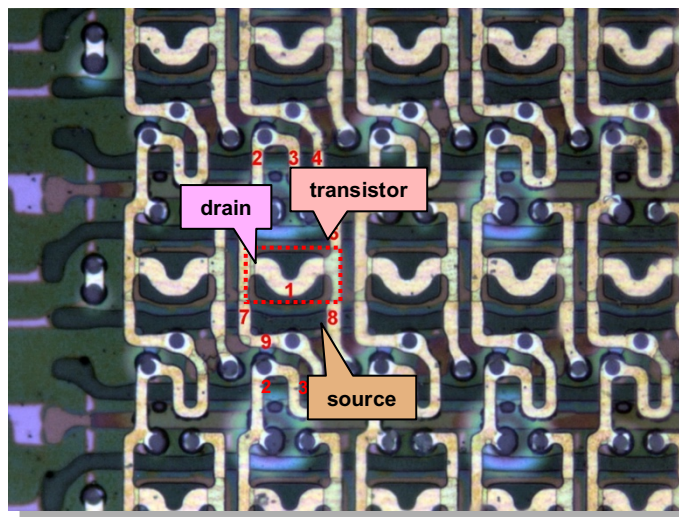
'338 Accused Instrumentalities



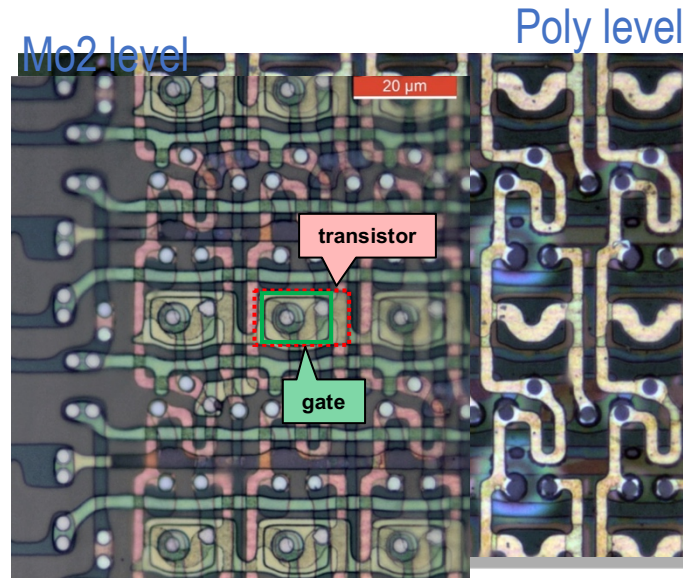
The source and drain of each of the transistors is formed in a different layer:

Claim Element

'338 Accused Instrumentalities



The gates of the transistors are also formed in a different layer:



Defendants' GDS files produced in this litigation further show said plurality of interconnections are formed from a conductive layer that is different from a layer forming the source and the drain of each of the transistors and a layer forming the gate of the transistors. See, for example, SDC_SC_0000128; SDC_SC_0000130; SDC_SC_0000144; SDC_SC_0000146; SDC_SC_0000148; SDC_SC_0000150; SDC_SC_0000152; SDC_SC_0000154; SDC_SC_0000168; SDC_SC_0000170; SDC_SC_0000172; SDC_SC_0000174; SDC_SC_0000196; SDC_SC_0000198; SDC_SC_0000200; SDC_SC_0000202; SDC_SC_0000204; SDC_SC_0000206; SDC_SC_0000212; SDC_SC_0000214; SDC_SC_0000220; SDC_SC_0000222; SDC_SC_0000224; SDC_SC_0000226; SDC_SC_0000232; SDC_SC_0000234.